

IN THE CLAIMS

9. (Currently amended) A semiconductor device precursor comprising:

a semiconductor substrate;

a layer of silicon dioxide formed on said semiconductor substrate, the surface of said layer of silicon dioxide having been doped with hydrogen ions deposited by a plasma source ion implantation process, wherein said layer of silicon dioxide ~~is free of~~ has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process; and

a layer of polycrystalline silicon formed on said layer of silicon dioxide, said layer of polycrystalline silicon having a smooth morphology.

10. (Currently amended) A field effect transistor comprising:

a semiconductor substrate;

a layer of silicon dioxide formed on at least a portion of said semiconductor substrate, the surface of said layer of silicon dioxide having hydrogen ions implanted therein by plasma source ion implantation, wherein said layer of silicon dioxide ~~is free of~~ has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process;

a layer of polycrystalline silicon formed on at least a portion of said layer of silicon dioxide, said layer of polycrystalline silicon having a smooth morphology;
and

a gate oxide formed on said semiconductor substrate from said layer of silicon dioxide having hydrogen ions implanted therein by plasma source ion implantation;

a source and a drain formed in said semiconductor substrate with a gate electrode formed on said semiconductor substrate from said layer of polycrystalline silicon to form a field effect transistor.

11. (Currently amended) A memory array comprising:

a semiconductor substrate;

a layer of silicon dioxide formed on at least a portion of said semiconductor substrate, wherein hydrogen ions are implanted into at least a portion of the surface of said layer of silicon dioxide by plasma source ion implantation, wherein said layer of silicon dioxide ~~is free of~~ has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process;

a layer of polycrystalline silicon formed over at least said portion of said layer of silicon dioxide into which said hydrogen ions were implanted, said layer of polycrystalline silicon having a smooth morphology;

a plurality of memory cells arranged in rows and columns, each of said plurality of memory cells comprising at least one field effect transistor;

a gate oxide for each of said field effect transistors formed on said semiconductor substrate from said layer of silicon dioxide having hydrogen ions implanted therein by plasma source ion implantation;

a source and a drain for each of said field effect transistors formed in said semiconductor substrate; and

a gate electrode for each of said field effect transistors formed on said semiconductor substrate from said layer of polycrystalline silicon.

12. (Currently amended) A semiconductor wafer comprising:

a wafer including a semiconductor substrate, said wafer being divided into a plurality of die;

a layer of silicon dioxide formed on at least a portion of said semiconductor substrate, on each of said plurality of die hydrogen ions are implanted into at least a portion of the surface of said layer of silicon dioxide by plasma source ion implantation, wherein said layer of silicon dioxide ~~is free of~~ has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process;

a layer of polycrystalline silicon formed over at least said portion of said layer of silicon dioxide into which said hydrogen ions were implanted, said layer of polycrystalline silicon having a smooth morphology;

a repeating series of gate oxides formed on said semiconductor substrate from said layer of silicon dioxide having hydrogen ions implanted therein by plasma source ion implantation;

a repeating series of sources and drains for at least one field effect transistor formed on each of said plurality of die, said series of sources and drains being formed on said semiconductor substrate; and

a repeating series of gate electrodes for at least one field effect transistor formed on each of said plurality of die, said series of gate electrodes being formed on said semiconductor substrate from said layer of polycrystalline silicon.

14. (Currently amended) A thin film transistor comprising:

a semiconductor substrate formed from a material selected from the group consisting of silicon dioxide, quartz and glass, the surface of said semiconductor substrate having hydrogen ions implanted therein by plasma source ion implantation, wherein said semiconductor substrate ~~is free of~~ has reduced sputtered metal contaminants in comparison with a semiconductor substrate doped with ions deposited by a Kauffman ion implantation process;

a layer of polycrystalline silicon formed on at least a portion of said semiconductor substrate, said layer of polycrystalline silicon having a smooth morphology;

a layer of an insulating material formed on at least a portion of said layer of polycrystalline silicon;

a gate oxide formed from said layer of insulating material;

a source region and a drain region formed in said layer of polycrystalline silicon; and

a gate electrode formed on said layer of insulating material.